

WIPE DISPENSING SYSTEM

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CROSS REFERENCE TO RELATED APPLICATIONS

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FIELD OF INVENTION

The present invention is related to a container for dispensing product in sheet form, such as kitchen wipes, bathroom wipes, baby wipes and the like.

BACKGROUND OF THE INVENTION

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Disposable wipe products, such as kitchen wipes, window wipes, baby wipes and the like, have become nearly ubiquitous in present day society, and both durable and disposable dispensers for such wipe products are well known and numerous in the prior art.

Developments in dispensing wipe products have focused on two primary goals which typically run counter to one another: (1) reducing cost; and (2) increasing user convenience.

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Wipe products sold in continuous-web formats are typically the least costly and thus would initially seem to be the most desirable. Since most disposable wipe products are formed as a continuous web and fed in their processing from roll to roll, they require the least further processing and are least expensive when sold as a continuous web on a roll (though accordion folding the web in a container is also somewhat common).

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Unfortunately, such continuous web formats are relatively inconvenient for users since the users themselves must perform the work of tearing off discrete units of the material, a task which often requires two hands and a moderate level of attention, even with pre-perforated web material. Many users are already engaged in other activities, such as changing a baby, and not only don't have a free hand, but also don't have the opportunity to pay much attention. Such continuous web formats have numerous disadvantages: they cannot readily be operated one-handed; they often rip unevenly, zigging and zagging on and off the perforated strip; the individual wipes can prematurely separate before dispensing aperture (also known as "fallback"); they frequently accidentally unwind much further than intended (also known as "chaining") and excess product must be discarded or sloppily and labor-intensively re-rolled.

To address these issues of convenience, relatively inexpensive "pop-up" dispensers have been developed to dispense discreet, interleaved wipes. In such systems, the user need only grasp and pull the portion of an individual sheet protruding from an aperture in the dispenser to dispense that single sheet, such action leaving a portion of the next sheet residing in the aperture and similarly presented for the next use.

5 Although interleaved pop-up systems typically do work better than prior continuous web systems, interleaved systems still have many drawbacks. Only a narrow range of reliable pop-up action exists between "chaining" and "fallback" failures.

Chaining occurs when product separation fails as a wipe is removed and multiple wipes
10 are accidentally withdrawn; fallback occurs when wipes separate prematurely before the dispensing aperture and the next wipe accidentally falls back inside the package where it is difficult to reach and rethread through the aperture. In order to fit within the narrow operating window that occurs between various failures, such interleaved pop-up systems require fine-tuning and balancing of various design considerations, such as, the dispensing aperture size and/or
15 shape, the extent of product overlap, compression during manufacture, shipping and/or storage, substrate properties, and, in the case of pre-moistened sheets, product loading. Further, such systems anticipate only a narrow range of average consumer interaction (e.g., how fast and with what regularity a consumer will withdraw a wipe). Thus, the required level of fine-tuning to fit within the narrow operating window may be disrupted by variations in either the manufacturing,
20 shipping, or storage of such packages, or variations in the manner in which consumers use the wipe, thus increasing the likelihood that chaining or fallback will occur.

Interleaved wipe systems never fully overcome their inherent cost disadvantage vs. continuous web systems. Discreet wipes which must be separated, folded, interleaved and stacked simply require more processing and are therefore usually more expensive than continuous
25 systems.

Therefore, the need remains for a system for dispensing wipes which combines the cost-effectiveness of a continuous web with the convenience and greater reliability previously only associated with pop-up interleaved sheet dispensing systems.

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SUMMARY OF THE INVENTION

A first aspect of the present invention provides a container for dispensing product in sheet form comprising:

- (i) the product in sheet form which will be dispensed; and

(ii) a dispensing aperture for product in sheet form, the aperture having opposing lateral edges, at least one of the lateral edges comprising a rotatable roller, the lateral edges providing a nip passage for controllably dispensing the product in sheet form in a non-downwards direction.

5 A second aspect of the present invention provides a container for dispensing a product in sheet form comprising:

(a) walls, the walls defining an inner cavity of the container for storing the product prior to dispensing; and

10 (b) a dispensing aperture in one of the walls, the aperture leading from the inner cavity to the environment external to the container, the aperture having opposing lateral edges, at least one of the lateral edges comprising a rotatable roller, the lateral edges providing a nip passage for controllably dispensing the product in sheet form.

A third aspect of the present invention provides a container for dispensing a product in sheet form comprising:

15 (A) walls, the walls defining an inner cavity of the container for storing the product prior to dispensing, one of said walls being a deck panel which includes a sealing section;

(B) dispensing aperture in the sealing section, said aperture having opposing lateral edges, at least one of the lateral edges comprising a rotatable roller, the lateral edges providing a nip passage for controllably dispensing the product in sheet form; and

20 (C) a lid hingedly in association with one of the walls, the lid being closably overlying the sealing section.

All documents cited are, in relevant part, incorporated herein by reference; the citation of any document is not to be construed as an admission that it is prior art with respect to the present invention.

25 It should be understood that every limit given throughout this specification will include every lower, or higher limit, as the case may be, as if such lower or higher limit was expressly written herein. Every range given throughout this specification will include every narrower range that falls within such broader range, as if such narrower ranges were all expressly written herein.

30 All percentages, ratios and proportions are by weight, and all temperatures are in degrees Celsius (°C), unless otherwise specified. All measurements are in SI units, unless otherwise specified.

BRIEF DESCRIPTION OF THE DRAWINGS

The above-mentioned and other features and objects of this invention and the manner of attaining them will become more apparent, and the invention itself will be better understood, by

reference to the following description of the invention taken in conjunction with the accompanying drawings, wherein:

- Figure 1 is a side view of one embodiment of a container of the present invention.
- Figure 2 is a top view of the container of Figure 1.
- 5 Figure 3 is a front view of the container of Figure 1.
- Figure 4 is a sectional view along 2-2 of one alternative embodiment of the container of Figure 1.
- Figure 5 is an enlarged view of the portion 6 of Figure 4.
- 10 Figure 6 is a sectional view along 2-2 of one alternative embodiment of the container of Figure 1.
- Figure 7. is a side view of one alternative embodiment of the container of Figure 1.
- Figure 8 is a side view of one alternative embodiment of the container of Figure 1.
- Figure 9 is a side view of one alternative embodiment of the container of Figure 1.
- Figure 10 is a side view of one embodiment of a container of the present invention.
- 15 Figure 11 is a side view of one embodiment of a container of the present invention.
- Figure 12 is a front view of the container of Figure 11.
- Figure 13 is a bottom view of the container of Figure 11.
- Figure 14 is a side view of one embodiment of a container of the present invention.
- Figure 15 is a top view of the container of Figure 14.
- 20 Figure 16 is a front view of the container of Figure 14.
- Figure 17 is a perspective view of one embodiment of a container of the present invention.
- Figure 18 is a perspective view of one embodiment of a container of the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

As used herein the phrase "downward direction" means a direction within 45 degrees of the gravitational force vector. The phrase "non-downward direction" means any direction which is not a downward direction.

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By "nip passage" herein is meant a specific distance between the lateral edges of the dispensing aperture wherein the space available for passage of the product in sheet form therethrough is such that the product in sheet form is simultaneously in contact with both lateral edges and is slightly compressed by such contact.

By "slightly compressed" herein is meant that a selected product in sheet form passes through the nip passage in response to a withdrawing force, but without the product in sheet form remaining in the container experiencing "chaining" or "fallback". In one preferred embodiment the compression as the product in sheet form as it passes through the nip passage reduces the thickness of the product in sheet form from about 0.5% to about 50% of its thickness prior to passage through the nip passage.

As used herein, the term "comprising" means that the various components, ingredients, or steps can be conjointly employed in practicing the present invention. Accordingly, the term "comprising" is open-ended and encompasses the more restrictive terms "consisting essentially of" and "consisting of".

Figures 1, 2 and 3 illustrate one possible embodiment of the present invention. Container 10 comprises an optional lid 20, a front wall 60, a back wall 70, a pair of sidewalls 80 and 90, a bottom wall or base 100 and a top wall or deck panel 50. All the walls, i.e., the front wall 60, back wall 70, pair of sidewalls 80 and 90, base 100 and the deck panel 50 may be collectively referred to as the container body. The container body comprises any suitable material, such as but not limited to: plastics, such as but not limited to, acrylate, natural and synthetic rubbers, polyurethanes, polyesters, such as polyethylene terephthalate (PET), polystyrenes, polyolefins, such as polypropylene, and combinations of plastics, such as laminates; metals; laminates, such as but not limited to, paper or cardboard, metal foil, polyethylene and/or paper; wood; and combinations thereof. In one optional embodiment of the present invention the container body is rigid. In another optional embodiment of the present invention the container body is semi-rigid. The various parts of the container body may be made of the same or different material.

The container of the present invention may be of any suitable shape and size, such as but not limited to, cubical, cuboidal, polyhedral, spherical, hemispherical, domed, pyramidal, conical, cylindrical, conical frustum, pyramidal frustum, and combinations thereof, which can store and dispense the product in sheet form. The embodiments illustrated in Figures 1 to 18 are merely some illustrations of possible embodiments of the present invention and not to be considered limiting in any fashion as to the shape or physical form of the container.

The deck panel 50 comprises a dispensing aperture having lateral edges 30 and 35, through which the product in sheet form (or product) 40 is dispensed. At least one of the lateral edges comprising a rotatable roller, that is, at least one of lateral edges 30 and 35 is a rotatable roller. In one optional embodiment of the present invention, which is illustrated in Figure 1, the deck panel 50 has a sealing section 55 containing the dispensing aperture having lateral edges lateral edges 30 and 35. The sealing section is the portion of the deck panel which the optional

lid at least overlies when it is in the closed position. The optional lid 20 of Figure 1 when in the closed position overlies not only the sealing section 55 but also the entire deck panel 50. In alternative, not illustrated optional embodiments, the optional lid when in the closed position overlies only the sealing section or the sealing section and a portion of the deck panel.

5 In one optional embodiment of the present invention the lateral edges, act as a seal, retarding, more preferably preventing, fluids, such as moisture, and the like, from entering the portion of the container body storing the product in sheet form, such as the inner cavity of the container. Additionally, in this optional embodiment the lateral edges retard, more preferably prevent, the product in sheet form from premature drying caused by evaporative loss of the
10 composition of matter from the substrate. The terms composition of matter and substrate explained in detail herein.

Each lateral edge may be the same or different shape. Furthermore, the shape may be uniform or may vary in size, shape and orientation. Furthermore, each lateral edge may be hollow and only having an outer surface, it may be solid, or it may include void spaces within its
15 shape. The lateral edges may be the same or different, that is, one hollow and the other solid, one solid and the other having void spaces therein, etc. The lateral edge, which is not a rotatable roller may be independently, for example, a nodule, a protuberance, a ridge, a lip, an isthmus, combinations of these and the like. Additional examples of suitable shapes for the non rotatable roller lateral edge, include but are not limited to, cylindrical, conical, conical frustum, spherical,
20 tear drop, pentagonal, hexagonal, diamond, rounded diamond, dog bone and combinations thereof. The lateral edge or edges, which are a rotatable roller may be, any suitable shape such as but not limited to, cylindrical, conical, conical frustum, spherical, tear drop, pentagonal, hexagonal, diamond, rounded diamond, dog bone and combinations thereof. The lateral edges may be the same or different shape. For example, one lateral edge is an isthmus while the other
25 is a rotatable cylindrical roller; one lateral edge is a rotatable cylindrical roller, while the other is a dog bone shaped rotatable roller.

In one optional embodiment of the present invention each lateral edge may optionally have on its surface a repeating pattern of protuberances and/or recesses, which may be regular or irregular in shape. In one optional embodiment, the repeating pattern on one of the lateral edges
30 is the opposite of the pattern on the other lateral edge, that is, the lateral edges comprise a male/female or female/male pair. Non-limiting examples of the shapes comprising these repeating patterns include domes, pyramids, diamonds, prisms, cylinders, cylindrical, such as teardrop shaped cylinders, conical, teeth, conical frustum, spherical, pentagonal, hexagonal, diamond, rounded diamond, dog bone and combinations thereof. In one optional embodiment,

the lateral edges may be a pair of intermeshing cylindrical gears, that is, the lateral edges are a pair of rotatable cylinders having teeth and are a male/female or female/male pair.

The lateral edges may be made of any suitable material, including but not limited to, laminates, alloys or combinations of materials. Each lateral edge may be made from the same or different materials. Material choice will depend upon many factors, such as but not limited to: what product in sheet form is, more specifically the substrate and the ingredients present in the composition of matter; the force required to retain the product in sheet form; cost; durability; which consumers will use the dispenser (e.g., adults, children and the like); etc. In one optional embodiment of the present invention the lateral edges may be made of: plastics, such as but not limited to, nylon, acrylate, natural and synthetic rubbers, polyurethanes, polyesters, polystyrenes, polyolefins, such as polypropylene, and combinations of plastics; metal, such as but not limited to, steel, such as stainless steel, surgical steel, tool steel and the like, copper, brass, aluminum and the like; composite materials, such as, graphite composites, fiberglass; and combinations thereof. In one optional embodiment at least one of the lateral edges may comprise one inner material which is surrounded by a second material which contacts the product in sheet form. This second surrounding material may be permanently attached to the inner material or it may be removable, such as a metal or plastic sleeve. A non-limiting example of this would be the lateral edges, which are a pair of rotatable rollers, explained in detail herein, comprising a metal core, which may be optionally totally or partially hollow, surrounded by a plastic coating which contacts the product in sheet form.

To remove a product 40, such as, a discrete individual wipe from the container 10, the consumer grasps the product 40 and exerts a force which is substantially away from the base 100 thereby removing the product 40 from the container 10. It is preferred that this force is a non downwards force, more preferably a force whose major component vector is substantially parallel to the product 40. The container of the present invention is capable of tolerating a wide variety of variations of consumer interaction, such as, how fast and with what regularity a consumer withdraws a wipe.

In another optional embodiment of the present invention the lateral edges may, during dispensing of the product in sheet form, exert sufficient force to remove some, but not all, of the composition of matter from the product in sheet form. This removal would allow for excess composition of matter to be present while the product in sheet form was in the container body, such as, the inner cavity of the container. This excess of composition of matter could be added to allow for any loss of composition of matter, such as but not limited to, loss due to spillage while replacing product in sheet form, evaporation, inversion of the container, etc.

In one optional embodiment of the present invention the container may comprise a closure. The closure is in association with one of the walls, and sealingly covering the aperture and the lateral edges when in the closed position. Examples of suitable closures include, but are not limited to, lids, resealable labels and the like. Figure 1 illustrates one such optional closure in 5 the form of optional lid 20.

In Figure 1 the optional lid 20 is movable about a fixed axis and allows for access to the product 40. The closure, such as optional lid 20, may be permanently attached to the container 10 or it may be removable. That is, optional lid 20 is in association with one of the walls, of the container body. The attachment may be in the form of a hinge, flexing point, rotation point, 10 spring or the like. This hinge may also optionally include a hinge opening aid or an automatic opening aid which, on the occurrence of an event, such as a consumer pushing a button, will open the optional lid fully: A closure may also optionally include a means for securing the closure to the container, including but not limited to, locking means, tongue and groove, latch, adhesive (e.g., when the closure is a resealable label), male and female members, and the like. In one 15 optional embodiment of the present invention the optional means for securing the closure to the container, for example by a locking means, is combined with an optional hinge opening aid or an automatic opening aid to make a container which affords a consumer easy access to the product in sheet form. The closure, such as lid or resealable label, may be of any suitable material, such as but not limited to: plastics, such as but not limited to, acrylate, natural and synthetic rubbers, 20 polyurethanes, polyesters, polystyrenes, polyolefins, such as polypropylene, high density polyethylene, laminates of polyethylene and combinations of plastics; metals; laminates, such as but not limited to, paper or cardboard, and polyethylene, metal foil and polyethylene and/or paper; wood; and combinations thereof. In one optional embodiment of the present invention the closure is made of the same material as the container body. In another optional embodiment of 25 the present invention the closure is made of the different material to the container body.

It is preferred that the closure, when in the closed position, covers the dispensing aperture having lateral edges and minimizes loss of any composition of matter, as described herein, from the product in sheet form, by evaporation. For example, in Figure 1 when optional lid 20 is in the closed position it covers the dispensing aperture having lateral edges 30 and 35 and minimizes 30 loss of any composition of matter from the product 40, by evaporation.

It is also preferred the closure, when in the closed position, acts to prevent water, air and other liquids and/or fluids from outside of the container from contacting the product in sheet form. For example, in Figure 1 when optional lid 20 is in the closed position it covers the

dispensing aperture having lateral edges 30 and 35 and prevents water, air and other liquids and/or fluids from outside of the container 10 from contacting the product 40.

In a non-illustrated optional embodiment of the present invention the dispensing aperture having lateral edges, through which the product in sheet form is dispensed, is on the closure. In 5 another non-illustrated optional embodiment of the present invention one of the lateral edges is present on the closure, such as a lid, while the other lateral edge is present on the deck panel. Closing the lid enables the lateral edges to form a nip passage thereby allowing the consumer to dispense the product in sheet form. This optional separation of the lateral edges provides for easy access to the interior of the container to, for example, replace or replenish the product in sheet 10 form, replace optional batteries, add additional composition of matter etc.

Additional information on closures, such as lids or resealable labels, container bodies for wipes, optional features present, such as, but not limited to, attachments of lids, hinges, and the like, can be found in U.S. Patent Nos. Des. 437,686 issued on February 20, 2001, to Balzar; Des. 443,508 issued on June 12, 2001, to Braaten; Des. 443,451 issued on June 12, 2001, to 15 Buck; Des. 421,901 issued on March 28, 2000, to Hill; Des. 421,902 issued on March 28, 2000, to Hill; Des. 416,794 issued on November 23, 1999, to Cormack; Des. 414,637 issued on October 5, 1999, to Amundson; Des. 445,329 issued on July 24, 2001, to Zethoff; 3,982,659 issued on September 26, 1976, to Ross; 3,967,756 issued on July 6, 1976, to Barish; 3,986,479, issued on October 19, 1976, to Boedecker; 3,994,417 issued on November 30, 1976, to 20 Boedecker; 6,269,970 issued on August 7, 2001, to Huang; 5,785,179 issued on July 28, 1998, to Buczwinski; 5,366,104 issued on November 22, 1994, to Armstrong; 5,322,178 issued on June 21, 1994, to Foos; 5,050,737 issued on September 24, 1991, to Joslyn; 4,971,220 issued on November 20, 1990, to Kaufman; 6,296,144 issued on October 2, 2001, to Tanaka; 6,315,114 issued on November 13, 2001, to Keck; 4,840,270 issued on June 20, 1989, to Caputo; 4,471,881 issued on September 18, 1984, to Foster; 5,647,506 issued on July 15, 1997, to Julius; 6,401,968 issued on June 11, 2002, to Huang; 6,269,969 issued on August 7, 2001, to Huang; 6,412,634 issued on July 2, 2002, to Telesca; 5,791,465 issued on August 11, 1998, to Niki; 6,092,690 issued on July 25, 2000, to Bitowft; and 6,092,690 issued on July 25, 2000, to Bitowft; and WO 00/27268 published on May 18, 2000, and assigned to The Procter & Gamble Co.; 25 WO 02/14172 published on February 21, 2002, and assigned to The Procter & Gamble Co.; and WO 99/55213 published on November 4, 1999, and assigned to The Procter & Gamble Co.

Figure 4 is sectional view along 2-2 showing the inner cavity 42 of one alternative embodiment of the container of Figure 1. In Figure 4 the product 40 is a plurality of discrete individual wipes 43, 44, 46 and 48 which are interleaved. The discrete individual wipes which

are interleaved can be folded in any of various known folding patterns, such as C-folding, S-folding, Z-folded, and the like. In Figure 4 the plurality of discrete individual wipes 43, 44, 46 and 48 are interleaved in a "Z-fold" configuration. A Z-folded configuration enables a folded stack of discrete individual wipes which are interleaved to be interleaved with overlapping portions. Exemplary fold patterns are disclosed more fully in, U.S. Patent, Nos. 6,213,344, issued on April 10, 2001, to Hill; 6,202,845, issued on March 20, 2001, to Hill; 5,332,118, issued on July 26, 1994, to Muckenfuhs; 6,030,331, issued on February 29, 2000, to Zander; 5,964,351, issued on October 12, 1999, to Zander; and 5,540,332, issued on July 30, 1996, to Kopacz. Alternatively, the discrete individual wipes which are interleaved may be folded in an alternating configuration, such as an alternating pattern of Z-fold and C-folds. An example of this alternating fold pattern can be found in U.S. Patent No. 6,250,495 issued on June 26, 2001, to Bando.

Figure 5 is an enlarged view of portion 6 of Figure 4 and illustrates the relationship between the lateral edges the product and the nip passage. The product 40 has a thickness L1 prior to passing the nip passage 950 formed by the lateral edges 30 and 35. While the product 40 is simultaneously in contact with both lateral edges 30 and 35 and is slightly compressed by such contact the product 40 has a thickness of L2. This thickness L2 is the dimension of the nip passage 950 which is the distance between the lateral edges of the dispensing aperture wherein the space available for passage of the product therethrough is such that the product is slightly compressed by such contact. Subsequent to passage through the lateral edges 30 and 35 the product 40 has a thickness of L3. Thickness L1 is approximately equal to L3, both of which are greater than L2.

Without wishing to be bound by theory, it is believed that during dispensing, the lateral edges generate specific forces (i.e., shear, compression, friction, normal) on the product in sheet form as it passes through the nip passage which are greater than the forces generated on the product in sheet form by itself, thereby preventing product remaining in the container experiencing "chaining" or "fallback".

The dimensions of the nip passage will vary depending upon many factors, such as but not limited to, the product in sheet form (i.e., the substrate and/or the composition of matter), the lateral edges (composition, shape, weight, physical properties, etc.), etc. Any suitable nip passage needs to be a distance which insures that the compression, friction and shear forces generated on the product by lateral edges, when the product is being dispensed, are significantly greater than the friction and shear forces at any product-product interface.

It is to be understood that during dispensing the nip passage, may vary that is, the distance between the lateral edges, with in a range of distances. For example, if the lateral edges are a pair of rollers having tear drop shaped cross-section, as the product is dispensed the rotation of the rollers will cause the distance between the pair of rollers to vary within a range of distances. Similarly, if one of the lateral edges comprise on its surface a repeating pattern of protuberances and/or recesses, as the product is dispensed the variation on the surface of the lateral edge will cause the distance between the lateral edges to vary within a range of distances. However, any such variation is within the scope of the present invention is such that the product in sheet form is simultaneously in contact with both lateral edges and is slightly compressed by such contact.

Figure 6 is sectional view along 2-2 showing the inner cavity 42 of another alternative embodiment of the container of Figure 1. In Figure 6 the product 40 is a continuous web of sheet material divided by a plurality of lines of frangibility running at predetermined intervals substantially transversely to the major axis of the web and defining individual wipes. Figure 6 also shows two optional features, a motor 900 and a sensor 910, both of which are explained in more detail herein.

Figure 7 is a side view of one alternative embodiment of the container 10 of Figure 1. The deck panel 110 is movable about location 115 in a manner to allow access to the inner cavity 42 of the container 10. This access to the inner cavity 42 of the container 10 allows, for example, the consumer to refill and/or replace the product 40. In Figure 6, deck panel 110 is permanently attached, but moveably mounted on the container 10 at location 115. This attachment may be in the form of a hinge, flexing point, rotation point, spring or the like. However, in an optional non-illustrated alternative embodiment the deck panel may be removable from the rest of the container to allow for access to the inner cavity 42 of the container. The deck panel 110 may also optionally include a means for securing the deck panel 110 to the container 10, including but not limited to, locking means, latch, tongue and groove, male and female members, and the like. Suitable means for securing are further described herein.

Figure 8 is a side view of one alternative embodiment of the container 10 of Figure 1 illustrating one lateral edge, in this case a rotatable roller 120, temporarily moved from a position proximate to the lateral edge 30 and the product 40. The rotatable roller 120 may be movable in the plane of the deck panel 50 to allow access to the inner cavity 42 of the container 10. In an alternative embodiment of the present invention which is not illustrated in the figures, the one lateral edge, such as a rotatable roller, is removable from the deck panel 50, thereby allowing access to the inner cavity 42 of the container 10. This access to the inner cavity 42 of the

container 10 allows, for example the consumer to refill and/or replace the product 40. To facilitate dispensing of the product 40 as, for example, discrete individual wipes, rotatable roller 120 is moved back to a position proximate to the product 40, allowing rotatable roller 120, to form with the lateral edge 30 the nip passage prior to dispensing of the product 40, such as the 5 position illustrated in Figure 1. This return of the rotatable roller 120 to contact with the product 40 may be done manually, that is by the consumer, or automatically by a spring, return spring and the like.

In the present invention at least one of the lateral edges is rotatable. That is, as the product in sheet form is being dispensed at least one of the lateral edges rotates. The direction of 10 rotation of the lateral edge will be one which aids in the dispensing of the product in sheet form. Typically, the direction of rotation of the lateral edge at the point of contact with the product in sheet form is the same direction in which the product in sheet form is dispensed. In one preferred embodiment of the present invention the lateral edge which rotates is a rotatable roller. In another preferred embodiment of the present invention the lateral edges are a pair of rotatable 15 roller. Figure 9 is a side view of one alternative embodiment of the container 10 of Figure 1, where the lateral edges are a pair of rotatable rollers 130 and 140. Rotatable roller 130 rotates in direction 150, that is, clockwise, whereas rotatable roller 140 rotates in direction 160, that is, anticlockwise. The rotatable rollers 130 and 140 may be made of the same material as the lateral edges and are as described in detail herein. In one preferred embodiment of the present invention 20 the pair of nipped rollers 130 and 140 comprise a metal core surrounded by a plastic coating which contacts the product 40.

In one optional embodiment of the present invention, the container may optionally comprise a motor connected to the rotatable roller, or optionally connected to one or both rotatable rollers when two rotatable rollers are present. Another optional embodiment of the 25 present invention, when two rotatable rollers are present the container may optionally comprise two motors, each connected to a rotatable roller. In one embodiment of the present invention the optional motor(s) may rotate the rotatable roller(s) to dispense the product in sheet form, while in another embodiment the optional motor(s) act as a brake to stop the rotatable roller(s) from rotating, or in a third embodiment the optional motor(s) may be some combination of brake and 30 rotation of rotatable roller(s) to dispense the product in sheet form. The motor may be any suitable motor, such as but not limited to, friction motor, wind up motor, clock work motor, electric (both AC and DC) and combinations thereof. In addition to the optional motor, additional optional features such as, but not limited to, gears, power source, such as, solar power,

battery, mains, wind and the like; brakes, cam, linkage or spring system; and combinations thereof may be present in the container of the present invention.

In another optional embodiment of the present invention one rotating roller, or two when the second optional rotating roller is present, may comprise a braking system, such as but not limited to, a cam, ratchet, linkage, spring system and the like. The optional braking system would activate after the desired amount of product in sheet form had been dispensed. In another other optional embodiment of the present invention one rotating roller, or two when the second optional rotating roller is present, may be constrained so that the rotating rollers are capable of rotation only in one direction. Furthermore, in another optional embodiment of the present invention, the rotating roller may optionally comprise a gearing system.

Another optional embodiment of the present invention a sensor may be present. The sensor may be connected to one or more of the rotatable rollers, any optional braking system present, and/or any optional motor present. The sensor upon activation would, for example, direct the motor to turn the pair of rotatable rollers to dispense a predetermined quantity of the product in sheet form, such as one discrete individual wipe. The sensor may be any suitable sensor, such as but not limited to: optical; sound, for example voice recognition; motion; heat or infrared; proximity; travel, such as distance moved by rotating roller or product in sheet form; rotation; translation; and combinations thereof. In one optional embodiment the sound sensor may respond to any sound, such as clapping, or to a specific voice command, such as "wipe".
The predetermined quantity of product in sheet form may be a specific length, a number of discrete individual wipes, such as one, two, or more. Additionally, the predetermined quantity may be based on the information received by the sensor, for example saying "two wipes", where the sensor is a sound sensor, the container will dispense two discrete individual wipes.

In Figure 10, a side view of one embodiment of a container of the present invention, the container 200 comprises a front wall 290, a back wall 270, a pair of side walls, only one of which is visible, namely side wall 280, a bottom wall or base 295 and a top wall or deck panel 225. All the walls, i.e., the front wall 290, back wall 270, pair of side walls including sidewall 280, base 295 and the deck panel 225 may be collectively referred to as the container body. The container body may comprise any suitable material as described in detail herein. Furthermore, the container 200, of this optional embodiment may comprise an optional lid, not illustrated, similar to the optional lids described herein.

The deck panel 225 comprises two deck members, a first deck member 220 and a second deck member 240. The first deck member 220 and second deck member 240 have opposing lateral edges 210 and 230, respectively, which provide a nip passage through which the product

260 is dispensed. While at least one of the lateral edges comprises rotatable roller, in one alternative embodiment of the present invention the lateral edges may be optionally a pair of rotatable rollers. Additional information on the lateral edges 210 and 230 and the optional pair of rotatable rollers may be found described herein.

- 5 The second deck member 240 is attached to the container body at location 250 and is capable of movement in the plane of Figure 9 as illustrated by direction arrow 242. The first deck member 220 is shown attached to the front wall 290 and is incapable of movement like the second deck member 240. Location 250 is a point around which the second deck member moves, and may be, for example, a hinge, a fulcrum, flexing point, rotation point, spring or the like.
- 10 Location 250 may also optionally include a hinge opening aid or an automatic opening aid which on the occurrence of an event, such as a consumer pushing a button, will open the second deck member fully. This movement of second deck member 240 allows for access to the inner cavity 245 of the container 200. This access to the inner cavity 245 of the container 200 allows, for example, the consumer to refill and/or replace the product 260. To facilitate dispensing of the
- 15 product 260 as, for example, discrete individual wipes, the second deck member 240 is moved back to a position proximate to the product in sheet form 260, allowing the lateral edge 230 with the other lateral edge 210 to form the nip passage prior to dispensing of the product 260, such as the position illustrated in Figure 10. This return of the second deck member 240 and the lateral edge 230 and the contact with the product 260 may be done manually, that is by the consumer, or
- 20 automatically by a spring, return spring and the like. Additional information on what location 250 may be found described herein.

- In a non-illustrated optional embodiment of the present invention both the first deck member and the second deck member are capable of movement. Alternatively, in another non-illustrated optional embodiment of the present invention it is possible to have a first deck member capable of movement and the second deck member attached to the back wall and is incapable of movement like the first deck member.

- In Figures 11, 12 and 13 illustrate one embodiment of a container of the present invention, the container 300, comprises, an optional lid 310, a top wall 350, a back wall 360, a pair of sidewalls 380 and 395, a bottom wall or base 370 and front wall 390. All the walls, i.e.,
- 30 the top wall 350, back wall 360, pair of sidewalls 380 and 395, base 370 and front wall 390 may be collectively referred to as the container body. The front wall 390 comprises a dispensing aperture having lateral edges 320 and 330, through which the product 340 is dispensed. This optional embodiment is similar to the embodiment illustrated in Figures 1 to 3 except that the product 340 is dispensed from the side of the container 300. The container body, lateral edges,

optional lid and other optional components of the dispenser may comprise any suitable container body, lateral edges, optional lid and other optional components as described in detail herein.

The optional embodiment illustrated in Figures 14, 15 and 16 is similar to the embodiment illustrated in Figures 1 to 3 and 10 to 13 except that instead of the container body having a rectangular shape, the container body is a domed shape. In Figures 14, 15 and 16 illustrate another embodiment of a container of the present invention, the container 400, comprises, a body section 440, and bottom wall or base 450. The container 400 comprises on its side a dispensing aperture having lateral edges 410 and 420, through which the product 430 is dispensed. The body section 440, and base 450 may be collectively referred to as the container body. The container body, lateral edges, and other optional components of the dispenser may comprise any suitable container body, lateral edges, and other optional components as described in detail herein.

In Figures 17, and 18 illustrate two alternative embodiment of a container of the present invention, where the walls of the illustrated containers are non-rigid, that is they are made of an at least partial flexible material. Suitable non-rigid materials are further described herein.

In Figure 17 the container 700, comprises a closure, which is in the form of a resealable label, 730, a top wall 750, a pair of sidewalls 740 and 795, a bottom wall or base 790 and a pair of crimps 760 and 780 which are joined in a manner define an inner cavity of the container 700 for containment of the product 770. The top wall 750 comprises dispensing aperture having lateral edges 710 and 720, through which the product in sheet form 770 is dispensed. All the walls, i.e., the top wall 750, pair of side walls 740 and 795, base 790 and the pair of crimps 760 and 780 may be collectively referred to as the container body. The container body, lateral edges, resealable label and other optional components of the dispenser may comprise any suitable container body, lateral edges, resealable label and other optional components as described in detail herein.

In Figure 18 the container 800, comprises a closure, which is in the form of a resealable label, 830, a top wall 880, a pair of side walls 840 and 850, a bottom wall or base 890 and a pair of end walls 860 and 870. The top wall 880 comprises dispensing aperture having lateral edges 810 and 820, through which the product in sheet form 825 is dispensed. All the walls, i.e., the top wall 880, pair of side walls 840 and 850, base 890 and the pair of sidewalls 860 and 870 may be collectively referred to as the container body. The container body, lateral edges, resealable label and other optional components of the dispenser may comprise any suitable container body, lateral edges, resealable label and other optional components as described in detail herein.

The containers of the present invention may also contain additional optional features not illustrated in any of the figures, including but not limited to: a cutting device (e.g., guillotine, hammer and anvil arrangement, blade, serrated edge, and the like) to facilitate separation of the product in sheet form into discrete individuals wipes; application of additional composition of matter, or components thereof, to the product in sheet form; addition of composition of matter to a substrate via the lateral edges to form the product in sheet form on dispensing; redistribution of the composition of matter releasably contained on the substrate; lubrication means for the lateral edges, especially when the lateral edges are a pair of rollers; means for the consumer to vary, such as increase or decrease, the force required dispense the product in sheet form, such as increasing the force to rotate the pair of rotatable rollers; heating elements in the lateral edges and/or the container body to warm or heat the product in sheet form; and combinations thereof.

Product in sheet form:

(i) Substrate

The term “product in sheet form” means a web or substrate which releasably carries a composition of matter. The term “releasably carries” means that the composition is contained in and/or on a web or substrate and is readily releasable from the web or substrate by applying some force to the web or substrate, such as, wringing the substrate, or wiping a surface, such as a counter, child or floor, with the substrate. Selection of the substrate is at the discretion of the formulator.

In one embodiment of the present invention, the substrate of the product in sheet form is a continuous web of sheet material, preferably divided by a plurality of multiple lines of frangibility, such as perforations, running at predetermined intervals substantially transversely to the major axis of the web and defining plurality of individual wipes. In another embodiment of the present invention, the substrate of the product in sheet form is a plurality of discrete individual wipes which are interleaved. This interleaving may be of any suitable configuration, including, but not limited to, “Z-fold”, “C-fold”, “S-fold” etc., and combinations thereof, as described in detail herein.

The manufacture of substrates for use herein forms no part of this invention. The following discussion is for convenience of formulation, but is not intended to limit the type of substrate used herein.

The substrate of the product in sheet form may include, but is not limited to, woven or nonwoven webs of natural fibers, synthetic fibers, or mixtures of natural and synthetic fibers. Suitable natural fibers include, but are not limited to, cellulosic fibers, such as wood pulp or pulp fibers, cotton, and rayon. Suitable synthetic fibers include fibers commonly used in textiles,

including, but not limited to, polyester and polyolefin, such as, polypropylene fibers. It is preferred that the substrate be selected from the group consisting of woven substrates, nonwoven substrates, foams, laminates, films, sponges, and combinations thereof. The selection of the substrate is at the discretion of the formulator, and may be based on many factors, including, but 5 not limited to, the intended use of the product in sheet form, cost, the material used in the lateral edges, processability and the like.

Various forming methods can be used to form a substrate for use in the present invention. For example, when the substrate is fibrous, it can be made by nonwoven dry forming techniques, such as air-laying, or alternatively by wet laying, such as on a papermaking machine. Other 10 nonwoven manufacturing techniques, including, but not limited to, techniques such as adhesive bonding, melt blown, spunbonded, needle punched, carding, coforming, and hydroentanglement and lamination methods may also be used.

It is preferred that when the substrate is a nonwoven or a nonwoven laminate it typically has a basis weight of from about of from about 10 grams per square meter (gsm) to about 100 15 gsm, more preferably from about 15 gsm to about 75 gsm, even more preferably from about 20 gsm to about 65 gsm.

In one embodiment, the substrate may be an air-laid nonwoven substrate comprising a combination of natural fibers, staple length synthetic fibers and binder, such as a latex binder. The dry fibrous web can be about 20-80 percent by weight wood pulp fibers, 10-60 percent by 20 weight staple length polyester and/or polyolefin fibers, and about 10-25 percent by weight binder.

In one embodiment, the dry substrate may comprise at least 50 percent by weight wood pulp fibers, and more preferably at least about 70 percent by weight wood pulp fibers. One particular air-laid nonwoven substrate which is suitable for use in the present invention comprises about 73.5 percent by weight cellulosic fibers (Southern softwood Kraft having an average fiber 25 length of about 2.6 mm); about 10.5 percent by weight polyester fibers having a denier of about 1.35 gram/9000 meter of fiber length and a staple length of about 0.85 inch; and about 16 percent by weight of a binder composition comprising a styrene butadiene copolymer. The binder composition can be made using a latex adhesive commercially available as Rovene 5550 (49 percent solids styrene butadiene) available from Mallard Creek Polymers of Charlotte, N.C.

30 One suitable air-laid nonwoven substrate for use in the present invention is the air-laid nonwoven substrate employed in PAMPERS brand baby wipes marketed by The Procter & Gamble Co. of Cincinnati, Ohio.

Another suitable substrate for use in the present invention is available from the J.W. Suominen Company of Finland, and sold under the FIBRELLA trade name, for example,

FIBRELLA 3100 and FIBRELLA 3160. FIBRELLA 3100 is a 62 gsm nonwoven web comprising 50% 1.5 denier polypropylene fibers and 50% 1.5 denier viscose fibers. FIBRELLA 3160 is a 58 gsm nonwoven web comprising 60% 1.5 denier polypropylene fibers and 40% 1.5 denier viscose fibers.

5 The following patents may referred to for their disclosures related to the substrate: U.S. Patent 3,862,472 issued Jan 28, 1975; U.S. Patent 3,982,302 issued Sept. 28, 1976; U.S. Patent 4,004,323 issued Jan. 25, 1977; U.S. Patent 4,057,669 issued Nov. 8, 1977; U.S. Patent 4,097,965 issued July 4, 1978; U.S. Patent 4,176,427 issued Dec. 4, 1979; U.S. Patent 4,130,915 issued Dec. 26, 1978; U.S. Patent 4,135,024 issued Jan. 16, 1979; U.S. Patent 4,189,896 issued 10 Feb. 26, 1980; U.S. Patent 4,207,367 issued June 10, 1980; U.S. Patent 4,296,161 issued Oct. 20, 1981; U.S. Patent 4,309,469 issued Jan 25, 1982; U.S. Patent 4,682,942 issued July 28, 1987; and U.S. Patents 4,637,859; 5,223,096; 5,240,562; 5,556,509; and 5,580,423.

15 It is also within the scope of the present invention that the term "substrate" includes laminates of two or more substrates or webs. Commercially available laminates, or purpose built ones would also be within the scope of the present invention. Additionally, the substrates may be flat or textured. The formation of textured substrates and laminates forms no part of this invention. The following discussion is for convenience of formulation, but is not intended to limit the type of substrate used herein.

In one alternative embodiment, the substrate may comprise a hydroentangled substrate 20 having a basis weight of about 62 grams per square meter and comprising about 50 percent by weight rayon fibers and about 50 percent by weight polyester fibers, polypropylene fibers, or a combination thereof. In another alternative embodiment, the substrate can comprise a laminate of two outer hydroentangled substrates, such as nonwoven substrate of polyester fibers having a basis weight of about 30 grams per square meter, joined to an inner constraining layer, which can 25 be in the form of net-like scrim or a continuous plastic film material which contracts upon heating to provide surface texture in the outer layers.

In one embodiment of the present invention the surface of the substrate is essentially flat. In another embodiment of the present invention the surface of the substrate may optionally contain raised and/or lowered portions. These can be in the form of logos, indicia, trademarks, 30 geometric patterns, images of the surfaces that the wipes are intended to clean (i.e., infant's bottom, adults face, fruit, toys, etc.). They may be randomly arranged on the surface of the substrate or be in a repetitive pattern of some form. They may be on one or both surfaces of the substrates. In one embodiment the substrate contains a repetitive pattern or alternating raised and lowered portions of the substrate. This variation in or on the surface of the substrate may be

included to convey to the consumer information on the product in sheet forms intended use, which brand or type of product in sheet form is being used or to aid in cleaning of the surface to which that the product in sheet forms is applied. In one embodiment the surface of the substrate that is in contact with the consumer is smooth, while the opposing surface that contacts the item 5 cleaned is rough or irregular in some fashion. It is believed, while not wishing to be limited by theory, that the variations in or on the surface provides mechanical effort to the surface in addition to the wiping action.

In one optional embodiment of the present invention the substrate is flushable. That is, it may be disposed of by flushing it down a toilet, commode or the like and the substrate would not 10 block the toilet or be a problem for a septic system.

In another optional embodiment of the present invention the substrate is biodegradable. For example the substrate could be made from a biodegradable material such as a polyesteramide.

(ii) Composition of matter:

The product in sheet form of the present invention can releasably carry a composition of 15 matter. The intended end use of the product in sheet form of the present invention, such as baby wipe, kitchen wipe etc., will play a significant part in selection of substrate and the composition of matter. The composition of matter may be in the form of a liquid; an emulsion, such as, an oil-in-water, a water-in-oil, a microemulsion or the like; a suspension, such as liquid in liquid, solid in liquid and the like; a paste or similar semi-solid; and the like. Selection of the composition of 20 matter is at the discretion of the formulator.

The manufacture or formulation of suitable compositions of matter as well as their combination with substrates to make the product in sheet form are well known and form no part of this invention. The following discussion is for convenience of formulation, but is not intended to limit the type of composition of matter used herein.

25 In one embodiment of the present invention the compositions of matter is releasably carried on the substrate prior to dispensing of the product in sheet form. In an alternative embodiment the composition of matter is added to the substrate by at least one of the lateral edges to form the product in sheet form. In another alternative embodiment part of the composition of matter is present on the substrate while another part of the composition of matter 30 is added to the substrate by at least one of the lateral edges to form the product in sheet form.

The wide range of uses to which the product in sheet form can be put includes, but is not limited to: cleaning of babies and/or infants such as in, baby wipes or wipes; toddler wipes; pre-moistened toilet paper, such as, "FRESH MATES"® available from The Procter & Gamble Company, and the like; cleaning of hard surfaces, typically those found in kitchens and

bathrooms, such as in, hard surface cleaning wipes, more particularly kitchen wipes, bathroom wipes, dish cleaning wipes, window wipes, disposable cloths for use in a floor cleaning system, such as for use in the SWIFFER® floor cleaning system, available from The Procter & Gamble Company, and the like; cleaning of people, such as, products for use in bathing/showering, for
5 removal of make up, in personal wipes, wipes for intimate cleaning, products for facial cleansing, skin conditioners, ointments, sun-screens, insect repellents, for addition of skin and/or hair conditioners; providing an antibacterial or sanitizing product, such as antibacterial wipes, sanitizing wipes and the like; providing a medicinal treatment, such as a wipe for treatment of acne and the like; products for cleaning or grooming of pets; products for cleaning eyeglasses,
10 products for cleaning automotive surfaces, both interior and exterior surfaces; and the like. The various components of the composition of matter, as well as the substrate, will depend upon the desired use of the product in sheet form. If the product in sheet form is to be used as baby wipes, then the composition of matter will contain components which are suitable for use in a baby wipe, such as, water, surfactants, skin care ingredients, child safe preservatives, buffer, etc.
15 Similarly, if the composition is for use as a hard surface cleaner then the composition of matter will contain components which are suitable for use in a hard surface cleaner wipes, such as, bleach, water, surfactants, solvent, hydrotrope, antibacterial agents, anti-streaking agents, etc.

The pH of the composition of matter will vary depending upon the end use of the product in sheet form, with the pH range selected being any suitable for the desired use of the product in
20 sheet form. Typically pH will range from about 4 to about 10. Similarly, the composition of matter may be transparent, translucent, opaque or colored.

Examples of suitable components of composition of matter include, but are not limited to: carriers; such as, water, organic solvents (such as, but not limited to, ethanol, polyols and the like), and mixtures thereof; surfactants, such as, anionic, nonionic, zwitterionic, amphoteric,
25 cationic and mixtures thereof; bleaches, such as, chlorine bleaches, e.g., NaOCl, oxygen based bleaches, e.g., hydrogen peroxide, and mixtures thereof; bleach activators; bleach catalysts, such as Nonanoyloxybenzenesulfonate (NOBS), Tetraacetylenediamine (TAED) and combinations thereof; preservatives; thickeners; enzymes; emollients, such as dimethicone, mineral oils, lanolin and the like; skin care agents; skin soothing aids; plant extracts, such as aloe,
30 chamomile, and the like; conditioners; humectants; perfumes; cyclodextrins; vitamins; perfume solubilizer; chelants; antibacterial agents; sanitizers; buffers; hydrotropes; process aids; polymers; corrosion inhibitors; builders; soil release polymers; polymeric dispersants; electrolytes; abrasives; bactericides; tarnish inhibitors; antifungal or mildew control agents; insect repellants; antioxidants; sunscreens; suds boosters; suds suppressors; suds stabilizers;

fillers; pigments; dye; and combinations thereof. Some illustrative, but not limiting, additional ingredients may be found in U.S. Patent Nos. 5,534,265 issued on July 9, 1996, to Fowler; 5,043,155 issued on August 27, 1991, to Puchalski; 6,300,301 issued on October 9, 2001, to Moore; 6,361,784 issued on March 26, 2002, to Brennan; 6,083,854 issued on July 4, 2000, to 5 Bogdanski; 5,648,083 issued on July 15, 1997, to Blieszner; 5,043,155 issued on July 15, 1997, to Puchalski; 6,207,596 issued on March 27, 2001, to Rourke; 5,888,524 issued on March 30, 1999, to Cole; 5,871,763 issued on February 16, 1999, to Luu; 4,741,944 issued on May 3, 1988, to Jackson; 3,786,615 issued on January 22, 1974, to Bauer; 6,340,663 issued on January 22 2002, to Deleo; and 6,440,437 issued on January 22, 1974, to Krzysik.

10 It is preferred that the composition of matter will be releasably carried on the substrate in an amount of from about 0.1 to about 20, more preferably from about 0.5 to about 15, even more preferably from about 1 to about 10 grams of composition of matter per gram of substrate.

15 All documents cited in the Detailed Description of the Invention are, in relevant part, incorporated herein by reference; the citation of any document is not to be construed as an admission that it is prior art with respect to the present invention.

20 While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.